BIOGRAPHICAL SKETCH

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NAME: Alexis Weiner
eRA COMMONS USER NAME (credential, e.g., agency login): ALEXIS_WEINER
POSITION TITLE: Postdoctoral Scholar

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	START DATE MM/YYYY	END DATE MM/YYYY	FIELD OF STUDY
Pennsylvania State University, University Park, PA	BS	08/2008	05/2013	Biology
Pennsylvania State University, University Park, PA	PhD	08/2015	05/2020	MCIBS
Stanford University, Stanford, CA		01/2020		Cell Biology

A. Personal Statement

My research goal is to further the understanding of how PCP signaling helps to coordinate the organization of whole tissues and contributes to disease pathology. In the future I intend to work at a research institution, in a tenure track faculty position, that places emphasis on cutting edge research in addition to extensive undergraduate/graduate teaching development. During my undergraduate years I worked towards a degree in biology that focused primarily on ecology and evolutionary biology. After a long time of searching for a lab to do undergraduate research I found an opportunity in Dr. Melissa Rolls cellular neuroscience lab investigating control of the neuronal microtubule cytoskeleton. The skills I learned include genetics, microscopy, molecular cloning, a deeper understanding of cellular signaling pathways, and scientific writing and communication. I knew I needed to expand my ability to think critically towards a project of my own. I took a year to volunteer in the lab full time as well as balance two other jobs to support myself financially. After that I took a position for a year as a full time Research Technologist in the Rolls lab. During this time, I trained two technicians and numerous undergraduate and graduate students. This was while I managed my own independent project. During this project I developed new quantification methods and assays that helped a graduate student complete their thesis. Eventually, I joined the Molecular Cellular and Integrative Biosciences Graduate (MCIBS) Program at Penn State. This interdisciplinary program allowed me to explore a broad range of subjects. In fact, I did two rotations that were geared towards my undergraduate studies. One of the labs was a human evolution lab where I learned immunohistochemistry in various mammals and the other was a chemical ecology lab where I expanded my skillset to include RNA/DNA sequencing in honey bees. Even though I found these labs compelling I could not look past the powerful tools used in the model systems of the Rolls lab. I decided to join the lab and within my first year published a first author paper which was the culmination of my work as a research technician. I also manage a team of 10-15 undergraduates each semester. For their training I developed a system of teaching modules that allows them to learn, grow as scientists, and produce data that has historically had an impact on the lab's success. During my years as a graduate student I was supporting author on six publications and authored three first author publications. For this proposed work I plan on a continued publication success at the highest level. I also intend on expanding my expertise in a new field, focused on PCP signaling, while mentored by Dr. Jeffrey Axelrod who is a leading figure in the field. If at all possible, I will recruit undergraduate mentees to continue development as a teaching scientist. As this is a passion of mine, I intend to always incorporate training of undergraduates into my research plan. This is possible while using a model system such as *Drosophila* because many of the techniques are amenable to a training program. After my postdoctoral training period I intend on applying for assistant professorships, starting my own lab and continuing mentorship of future scientists.

Bibliography

1. Weiner AT, Thyagarajan P, Shen Y, Rolls MM. To nucleate or not, that is the question in neurons. Neurosci Lett. 2021 Mar 8;751:135806. doi: 10.1016/j.neulet.2021.135806. Epub ahead of print. PMID: 33705928.
2. Weiner AT, Seebold DY, Torres-Gutierrez P, et al. Endosomal Wnt signaling proteins control microtubule nucleation in dendrites. PLoS Biol. 2020;18(3):e3000647. Published 2020 Mar 12. doi:10.1371/journal.pbio.3000647
3. Weiner AT, Seebold DY, Michael NL, et al. Identification of Proteins Required for Precise Positioning of Apc2 in Dendrites. G3 (Bethesda). 2018;8(5):1841-1853. Published 2018 May 4. doi:10.1534/g3.118.200205
4. Weiner, Alexis T., et al. "Kinesin-2 and Apc function at dendrite branch points to resolve microtubule collisions." Cytoskeleton, vol. 73, no. 1, 2016, pp. 35–44., doi:10.1002/cm.212

Complete List of Published Work in My Bibliography:
https://pubmed.ncbi.nlm.nih.gov/?term=alexis+weiner&sort=date

B. Positions and Honors

Positions and Employment

2014 - 2015	Research Technologist 1
2015 - 2020	PhD Graduate Candidate, Penn State University
2020 -	Postdoctoral Scholar, Stanford University

Other Experience and Professional Memberships

2013 - 2019	Member, Pittsburgh Local Traffic Meeting
2016 -	Member, American Society for Cell Biology

Honors

2018	EMBO First Place Poster Mechanisms of Neuronal Remodeling
2019	Penn State Graduate Student Excellence in Mentoring Award
2020	Stanford University School of Medicine Dean's Fellow

Talk Invitations

2016	Pittsburgh Local Traffic Meeting student talk
2017	American Society for Cell Biology minisymposium talk
2018	2018 EMBO Mechanisms of Neuronal Remodeling Poster (Israel)
2019	Microtubules, Motors, Transport and Trafficking (India)

C. Contribution to Science

1. **Early Career:** My contributions as an undergraduate researcher involved an RNAi candidate screen in *Drosophila melanogaster* to identify genes that were involved in a neuronal injury response. Up until the point where I entered the lab as a junior the previous lab members had found only one reporter of axon injury. I set out and discovered two new reporters that the lab could use as tools to better understand how the cell responds to axon injury. These two new discoveries have led to offshoots for graduate rotation students and thesis projects alike.
    a. Lee DL, Kim J, Shorey M, Weiner AT, Rolls MM. Using Axon Regeneration in Drosophila to Understand Signaling and Intracellular Organization in Neurons. Penn State Undergraduate Poster Symposium; 2015; University Park, PA.

    Research Technologist: When I worked for a year as a volunteer and subsequently a year after that as a paid full time Research Technologist my work consisted of following up work done by the first

graduate student (Floyd mattie) in the lab. This work centered on a steering complex that functioned as a microtubule polarity gate keeper at dendrite branch points. During this time I was able to collaborate with Dr. William Hancock's lab in the Penn State Bioengineering Department. I was able to elaborate on a mechanism proposed by Dr. Floyd Mattie. His mechanism showed that a complex composed of Apc, Eb1, and a motor protein Kinesin-2 functioned to steer microtubules and maintain microtubule polarity. I then demonstrated the exact location where the steering occurs which happens to be along pre-existing microtubule tracks at dendrite branch points. During this time I attended my first meeting at the Local Pittsburgh Traffic Symposium which meets every year at the University of Pittsburgh. At this meeting I presented my first poster. In addition to work that later led to my first author paper on that story I also helped another graduate student by creating a quantification method for microtubule nucleation at branch points. This quantification method was used in a revision and subsequently successful submission of that students manuscript.

b. Weiner AT, Lanz M, Goetschius D, Teeters G, Hancock W, Rolls MM. Kinesin-2 Functions to Steer Microtubules at Dendrite Branch Points. 13th Annual Pittsburgh Local Traffic; 2014 May; Pittsburgh, PA.
c. Nguyen, M. M., et al. " g-Tubulin controls neuronal microtubule polarity independently of Golgi outposts." Molecular Biology of the Cell, vol. 25, no. 13, July 2014, pp. 2039–2050., doi:10.1091/mbc.e13-09-0515.

2. **Graduate Career:** As a PhD graduate candidate I was fortunate enough to publish a first author paper during my first year. This was follow up to my work done as a research technologist. However, my graduate work was just as fruitful. I switched to studying another microtubule regulator at branch points. This concerns the placement of nucleation complexes at branch points so that a pool of microtubules can be made in dendrites and contribute to their organization. The machinery necessary for this was surprising and exciting. I found a Wnt signaling variant, including GPCRS (frizzled and frizzled2) G-proteins and Axin, operates to coordinate microtubule nucleation machinery at branch points. This specifically includes the microtubule core nucleator gamma-tubulin. This is exciting because it uncovers a previously undisclosed function for these pathway members and may have major ramifications for neuronal health. I was invited to talk about this work at the 17th Annual Pittsburgh Local Traffic Symposium and also presented a poster. This garnered attention from high profile journal editors such as The Journal of Cell biology. I also presented a poster at the 2016 Annual ASCB National Meeting. I was invited to not only present a poster but to give a minisymposium on the subject at the 2017 Annual ASCB National Meeting. Additionally, I was accepted to present a poster at the Mechanisms of Neuronal Remodeling where I won first prize in Israel. Soon after I had another chance to present internationally in India, when I was accepted to give a talk at a cytoskeletal meeting. In total I published three first author and six supporting author publications in graduate school.

a. Weiner AT, Seebold DY, Torres-Gutierrez P, et al. Endosomal Wnt signaling proteins control microtubule nucleation in dendrites. PLoS Biol. 2020;18(3):e3000647. Published 2020 Mar 12. doi:10.1371/journal.pbio.3000647
b. Weiner AT, Seebold DY, Michael NL, Guignet M, Feng C, Follick B, Yusko BA, Wasilko NP, Torres-Gutierrez P, Rolls MM. Identification of proteins required for precise positioning of Apc2 in dendrites. G3 (Bethesda). 2018 May 4;8(5):1841-1853. doi: 10.1534/g3.118.200205.
c. Weiner AT, Seebold DY, Michael ML, Guignet M, Feng C, Follick B, Yusko, BA, Wasilko NP,Torres-Gutierrez P, Rolls MM. Wnt pathway players target microtubule regulators to dendrite branch points. 2016 Annual ASCB National Meeting (Talk)
d. Weiner AT, Lanz MC, Goetschius DJ, Hancock WO, Rolls MM. Kinesin-2 and Apc function at dendrite branch points to resolve microtubule collisions. Cytoskeleton (Hoboken). 2016 Jan;73(1):35-44. doi: 10.1002/cm.21270.

D. Additional Information: Research Support and/or Scholastic Performance

Scholastic Performance

YEAR	COURSE TITLE	GRADE
	THE PENNSYLVANIA STATE UNIVERSITY GRADUATE CLASSES	
2015	Experimental Teaching	A
2015	Molecular Cellular Genetics Core Concepts	B
2015	Colloquium	A
2015	Ethics Life Sciences	A
2016	Eukaryotic Cell Biology	A
2016	Current Research Seminar	A
2016	Colloquium	A
2016	Comparative Neuroanatomy	B
2017	Molecular Biology and Development	B+
2017	Systems Neuroscience	A-